

PRESENT STATUS OF THE 

50X1

DOCUMENT NO.   
 NO CHANGES  
 CLASS. CONTROL NO.   
 NEXT REVIEW DATE:  2010  
 AUTH: HR 7042  
 DATE: 9 DEC 1980 REVIEWER: 064540

## PROJECT AND TENTATIVE PRODUCTION DEVELOPMENT

## OPMENT PLANS

All major design problems have been solved in the engineering prototype. However, several circuit margins have never been calculated; for example, the number of turns on triggering cores which will provide positive triggering under all conditions of environment and component variation, without causing bogus triggering on noise, is not subject to ready calculation but was found to be of sufficient latitude to permit guessing. In these areas where no trouble has been experienced but where careful investigations are needed for safety, further development time must be scheduled. Where such margins cannot be made calculable, they must be determined empirically. An empirical determination, backed up with all available facts and careful estimates of maxima and minima, is often the safest procedure. Production should not be started until all necessary refinements have been embodied in the production prototype and all associated paperwork updated. Because of the design complexity of the , a few unforeseen problems will undoubtedly appear when quantity production is begun.

Temperature runs were performed on the engineering breadboard, but not as yet on the engineering prototype. During breadboard tests, capacitor shorts and other delay-causing component failures occurred; the components in question were early ventures of the industry into the present range of standard physical sizes, drawn from the Laboratory's older stocks in conservation of current items, and they should not be considered representative. The temperature extremes reached

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design goals. Although the tests were speedily conducted, no serious and insoluble problems appeared. There is every indication that the hoped-for environmental range of  $-40^{\circ}$  to ~~160~~<sup>140</sup> centigrade will not need to be reduced.

In the planning and re-layout of the production prototype, some space will be saved through hindsight of the engineering prototype, and this will be devoted mainly to increasing clearances and uncrowding components. No dramatic reduction in  $\phi$  case size is expected. One very major improvement is planned: the use of individual connector pins of a very reliable type amid the components on the  sub-module<sup>50X1</sup>, so that they may be plugged into mating pins on the interconnecting circuit boards, eliminating the need for cabled leads from the modules, and permitting replacement and substitution. This modification will require little more than substitution of connector pins for eyelets and soldering posts now in use, and will, if anything, reduce the assembled size, since the modules will mount parallel to the interconnecting boards rather than nesting between each other, perpendicularly. Circuit conductors on the modules will face out in one plane, for test accessibility, and furthermore, modules may be unplugged and connected remotely by a patch cable where production troubleshooting is necessary. Tested modules can be used to check out newly wired chassis. The modules ~~\$\$\$~~ to be made pluggable comprise the sense amplifiers, strobers, both flip-flops, clock, and drivers. It would not be profitable to adapt the ring counter, scanning register<sup>f</sup>, and memory sections to pluggability, although they are already in module form, because they do not fasten to an interconnecting circuit board. The power supply might be made pluggable.

To ensure that production units will have the greatest possible life expectancy and generally to improve the quality of the product, each [ ] production unit should have a planned series of margin checks conducted upon it. The plug-in modules may be easily checked first, on a master [ ] unit equipped with variable supply voltages and switched test points for rapid scope observation. The test setup could be altered between completion of different plug-in module runs. All such tests will be unavoidably time-consuming, but many might be eliminated for a second run once confidence in the design is established. The "master unit" referred to would of course be the production prototype itself, partially disassembled and wired in with numerous cables to potentiometers, supplies, and scope inputs. It is seen that such a setup would become a very extensive piece of test equipment, with potentials for quick development of special [ ] modifications for special applications, or new adapter dords for use with ~~\$\$\$~~ unmodified [ ]

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